

REMARKS

In view of the foregoing amendments and the following remarks, Applicants respectfully request reexamination of the present application. Claims 1, 13, 26, 33, 40, 47, 52, 57, 59, 64, 70, 75 and 80 have been amended and Claims 27 and 34 have been cancelled. No new Claims have been added.

Claim Rejections – 35 USC § 103

The Examiner has rejected all of the pending claims, namely Claims 1-85, under 35 U.S.C. 103(a), as being unpatentable over U.S. Patent No. 5,985,356 by Schultz et al. in combination with U.S. Patent No. 5,534,066 by O'Neill et al.

The Examiner states that Schultz et al. teach a process for depositing a plurality of reacted materials upon specific regions of a substrate and analyzing various properties of the deposited materials. The Examiner also states that the materials may be a variety of material and different compositions and that the materials are synthesized and analyzed. The Examiner further states that a variety of properties can be analyzed and the components are reacted after deposition, which includes heating, and the screening techniques are various.

The Examiner admits that Schultz et al. fail to specifically teach a "real-time" monitoring of the system for changes in the composition of the reacted materials. However, the Examiner states that O'Neill et al. teach a fluid delivery apparatus having an infrared feedline sensor for sensing the concentration of a component of the feed gas and that the sensing and monitoring is done continuously and in real-time.

The Examiner concludes that it would have been obvious at the time the invention was made to have modified the Schultz et al. process to incorporate "real-time" monitoring as evidenced by O'Neill et al., with the expectation of achieving a more consistent final product as a result of tighter control of the process to avoid downtime or unacceptable results.

With respect to Claims 6-9, 19-22, 27, 28 and 35, the Examiner admits that Schultz et al. are silent with regard to the various claimed depositing techniques. The Examiner states that while he acknowledges the fact that the prior art is silent upon the claimed techniques, it is the Examiner's position that one skilled in the art at the time the invention was made would have had a reasonable expectation of achieving similar results regardless of the depositing technique utilized. Furthermore, the prior art disclose numerous techniques that suggest to one skilled in the art that deposition technique is not critical to produce desired results.

Relevant Legal Doctrines

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). In addition, there must be a teaching or suggestion to make the claimed combination and a reasonable expectation of success that are found in the prior art, and not in the applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). In determining the propriety of the Patent Office case for obviousness in the first instance, it is necessary to ascertain whether or not the reference teachings would appear to be sufficient for one of ordinary skill in the relevant art having the reference before him to make the proposed substitution, combination, or other modification. *In re Linter*, 458 F.2d 1013, 1016, 173 USPQ 560, 562 (CCPA 1972).

There are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art. *In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457-58 (Fed.Cir. 1998) and MPEP 2143.01. When the motivation to combine the teachings of the references is not immediately apparent, it is the duty of the examiner to explain why the combination of the teachings is proper. *Ex parte Skinner*, 2 USPQ2d 1788 (Bd. Pat. App. & Inter. 1986).

U.S. Patent No. 5,985,356 by Schultz et al.

Schultz et al. is directed to a method and apparatus for the preparation and use of a substrate having an array of diverse materials in predefined regions on the substrate. The substrate is prepared by delivering components (i.e., reactants) of materials to predefined regions on the substrate and simultaneously reacting the components to form at least two materials. See, e.g., the Abstract. An array of materials having different chemical compositions is formed by individually delivering the different reactants to pre-defined regions on the substrate in a step-wise fashion. Multiple deposition steps and masking techniques are necessary to vary the concentration of a particular reactant that is deposited on a given region of the substrate. A small, precisely metered amount of each reactant component is delivered into each reaction region. (Col. 10, lines 37-39 and Col. 15, lines 8-17). By varying the amount of the individual reactants deposited from one region to another region, different materials can be formed on the substrate.

U.S. Patent No. 5,534,066 by O'Neill et al.

O'Neill et al. disclose a chemical vapor deposition (CVD) apparatus. Referring to Fig. 1 of O'Neill et al., the apparatus includes a reservoir 30 containing a reactant 32. A conduit 34 delivers the reactant in a carrier gas 38a to the reaction chamber 22. Diluent gases 38b and 38c are combined with the reactant and carrier gas before passing through an IR sensor 40. The IR sensor, coupled to a computer (see, e.g., Fig. 7) can be used to control the mass flow of the carrier gas and diluent gases via mass flow controllers, thereby controlling the deposition rate of the reactant in the CVD chamber. (See, e.g., Fig. 8 and Col. 5, line 42 to Col. 6 line 9). Alternatively, the computer calculates the flow of input gas from the concentration measured by the detector, integrates the results versus time and adjusts the time of the deposition or other process parameters (e.g., deposition or etch rate). See Col. 5, lines. 46-53. The CVD reactor is preferably a plasma reactor. (Col. 2, lines 54 to 57).

Claims 1 to 12

Independent Claim 1 has been amended to recite that the first and second material components are mixed prior to deposition of the material system onto a substrate, where a material property of the intermixed material system is varied. Support for this amendment can be found through out the specification, including in Fig. 1 and at page 5, lines 12-22. As is discussed above, Schultz et al. discloses delivering components of materials to predefined regions on a substrate and then reacting the components to form the materials. There is no disclosure or suggestion of mixing first and second material components prior to deposition onto a substrate or a material property of the intermixed material system is varied. Therefore, removal of this rejection with respect to Claim 1 is requested.

Further, the references would not lead one of ordinary skill in the art to the claimed invention. As noted above, Schultz et al. does not disclose or suggest the variation of a material property of a component on a real time basis. O'Neill et al. also does not disclose or suggest the variation of a material property of a system component on a real-time basis. O'Neill et al. merely disclose the variation of carrier gas and diluent gas flow rates into a CVD reactor for deposition of the vapor onto the substrate. The carrier gas and diluent gas of O'Neill et al. are *not* material system components that are deposited on a substrate. The reactant composition is not varied by O'Neill et al., nor is any property of the reactant.

Dependent Claims 2 and 3 recite that at least one of the components is a particulate reacted precursor. O'Neill et al. is directed to a CVD process and is not even amenable to particulates. Dependent Claim 7 recites that the feature is a linear feature.

In view of the foregoing, Applicants request removal of this rejection with respect to Claims 1 to 12.

Claims 13 to 25

Independent Claim 13 has been amended to recite that the relative concentration of at least one of the first material system component and the second material system component is varied on a real-time basis prior to deposition of the intermixed material system. Support for this amendment can be found on page 5, lines 12-22 of the

specification. As is discussed above, Schultz et al. does not disclose such a process step. Further, O'Neill et al. merely disclose the variation of the flow rate of a carrier gas and/or diluent gas into a CVD chamber, not the relative concentrations of material system components. There is no change in the deposited material composition according to O'Neill et al. and, in fact, O'Neill et al. is attempting to maintain the *same* film thickness throughout the deposition process.

Therefore, removal of this rejection with respect to Claims 13 to 25 is requested.

Claims 26 to 32

Independent Claim 26 is directed to the fabrication of a multi-layer structure in the form of a linear feature wherein the composition of at least one layer is varied on a real-time basis during deposition. Claim 26 has been amended to provide that the structure is a linear feature and that the composition is varied during the depositing step such that the linear structure includes different first and second portions of different compositions. Neither of the cited references discloses or suggests forming such a linear multi-layer structure.

Therefore, removal of this rejection with respect to Claims 26 to 32 is requested.

Claims 33 to 39

Independent Claim 33 recites that the ratio of the first material to the second material is varied on a real-time basis during the formation of a multi-layer structure and has been amended to recite that the feature is a linear feature having at least first and second portions of differing multi-layer compositions. As stated above, neither Schultz et al. or O'Neill et al. disclose or suggest varying the ratio of two materials on a real-time basis forming a linear multi-layer structure.

Therefore, removal of this rejection with respect to Claims 33 to 39 is requested

Claims 40 to 46

Independent Claim 40 recites that at least one of the material system components is a particulate reacted precursor and has been amended to recite that the system components are mixed *prior to* depositing. As is discussed above, Schultz et al. does not disclose or suggest fabricating a particulate reacted precursor and mixing the components prior to the deposition step. O'Neill et al. is directed to a CVD process and is not even amenable to the deposition of *any* particulate materials.

Therefore, removal of this rejection with respect to Claims 40 to 46 is requested.

Claims 47 to 51

Independent Claim 47 recites that the material system is an ultra-low fire conductor composition and at least one of the components is a metal-organic decomposition compound, and has been amended to recite that the composition is varied prior to the deposition step. Such material systems are neither disclosed nor suggested by Schultz et al. or O'Neill et al. Further, neither Schultz et al. nor O'Neill et al. disclose or suggest varying the composition during the providing step.

Therefore, removal of this rejection with respect to Claims 40 to 46 is requested.

Claims 52 to 56

Independent Claim 52 recites that the components include an electrocatalyst and a polymer and has been amended to recite that a material property of at least one of the components is varied *prior to* deposition of the intermixed material system. Such a combination is neither disclosed for suggested by Schultz et al. or O'Neill et al. Further, the CVD process of O'Neill et al. would not even be capable of depositing such a composition.

Therefore, removal of this rejection with respect to Claims 52 to 56 is requested.

Claims 57 to 63

Independent Claim 57 recites that the components include carbon and a polymer, and has been amended to recite that a material property is varied during the providing step and *prior to deposition*.

Therefore, removal of this rejection with respect to Claims 57 to 63 is requested.

Claims 64 to 69

Independent Claim 64 recites a process wherein at least one of the components is a particulate component and the relative concentration of at least one of the components is varied on a real-time basis, and has been amended to recite that the relative concentration is varied *before* the deposition of the composition. As is discussed above, neither reference discloses or suggests varying the relative concentration on a real-time basis prior to deposition. Further, the CVD process of O'Neill et al. is not amenable to the deposition of particulate materials.

Therefore, removal of this rejection with respect to Claims 64 to 69 is requested.

Claims 70 to 74

Independent Claim 70 recites that the composition is an ultra-low fire composition including at least a metal-organic decomposition compound and that at least the relative concentration of the components is varied on a real-time basis prior to the deposition step. As is discussed above, neither of these aspects are disclosed or suggested by Schultz et al. or O'Neill et al.

Therefore, removal of this rejection with respect to Claims 70 to 74 is requested.

Claims 75 to 79

Independent Claim 75 recites that the composition includes at least an electrocatalyst and a polymer and that at least the relative concentration of the components is varied on a real-time basis during the providing step. As is discussed above, neither of these aspects of the present invention is disclosed or suggested by the prior art of record.

Therefore, removal of this rejection with respect to Claims 75 to 79 is requested.

Claims 80 to 85

Independent Claim 80 recites that the components include at least carbon particles and a polymer and that the relative concentration of the components is varied on a real-time basis prior to deposition of the composition. As is discussed above, neither of these aspects of the present invention is disclosed or suggested by the prior art of record.

Therefore, removal of this rejection with respect to Claims 80 to 85 is requested.

The Examiner has provisionally rejected Claims 1-85 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-5, 13-15, 18-21, 24-27, 31, 40-43, 64-67, 75-77, 80-83, 86-89, 93-95, 103-105, 108-111 and 114-117 of U.S. Patent Application No. 09/821,723. Upon the indication of otherwise allowable subject matter, Applicants will submit a Terminal Disclaimer, if appropriate, with respect to this co-pending application.

Applicants believe that all pending claims are in condition for allowance and such disposition is respectfully requested. In the event that a telephone conversation would further prosecute and or expedite allowance, the Examiner is invited to contact the undersigned.

Respectfully submitted,

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